

## Coupled Tanks System

This book develops the understanding and skills needed to be able to tackle original control problems. The general approach to a given control problem is to try the simplest tentative solution first and, when this is insufficient, to explain why and use a more sophisticated alternative to remedy the deficiency and achieve satisfactory performance. This pattern of working gives readers a full understanding of different controllers and teaches them to make an informed choice between traditional controllers and more advanced modern alternatives in meeting the needs of a particular plant. Attention is focused on the time domain, covering model-based linear and nonlinear forms of control together with robust control based on sliding modes and the use of state observers such as disturbance estimation. Feedback Control is self-contained, paying much attention to explanations of underlying concepts, with detailed mathematical derivations being employed where necessary. Ample use is made of diagrams to aid these conceptual explanations and the subject matter is enlivened by continual use of examples and problems derived from real control applications. Readers' learning is further enhanced by experimenting with the fully-commented MATLAB®/Simulink® simulation environment made accessible at [insert URL here](#) to produce simulations relevant to all of the topics covered in the text. A solutions manual for use by instructors adopting the book can also be downloaded from [insert URL here](#). Feedback Control is suitable as a main textbook for graduate and final-year undergraduate courses containing control modules; knowledge of ordinary linear differential equations, Laplace transforms, transfer functions, poles and zeros, root locus and elementary frequency response analysis, and elementary feedback control is required. It is also a useful reference source on control design methods for engineers practicing in industry and for academic control researchers.

The University of Genoa - Ohio State University Joint Conference on New Trends in Systems Theory was held at the Badia di S. Andrea in Genoa on July 9-11, 1990. This Proceedings volume contains articles based on two of the three Plenary talks and most of the shorter presentations. The papers are arranged by author, and no attempt has been made to organize them by topic. We would like to thank the members of the Scientific Committee and of the Program Committee, the speakers and authors, and everyone who attended the conference. Approximately 120 researchers and students from all over the world visited Genoa for the meeting, representing a wide spectrum of areas in pure and applied control and systems theory. The success of the conference depended on their high level of scientific and engineering expertise, not to mention their enthusiasm. The Conference on New Trends in Systems Theory would not have been possible without the help of a great many institutions and people. We would like to thank the University of Genoa, particularly Professor Enrico Beltrametti, and the Ohio State University's Columbian Quincentenary Committee led by Professor Christian Zacher, for encouragement and financial assistance. The University of Genoa Mathematics Department and Communication, Computer and System Sciences Department supplied assistance and technical help. The staff of the Consorzio Genova Ricerche, particularly Ms. Piera Ponta and Ms. Camilla Marconi, worked diligently over many months and especially during the conference itself to insure a smooth and enjoyable meeting.

Soft computing techniques have reached a significant level of recognition and acceptance from both the academic and industrial communities. The papers collected in this volume illustrate the depth of the current theoretical research trends and the breadth of the application areas in which soft computing methods are making contributions. This volume consists of forty six selected papers presented at the Fourth International Conference on Recent Advances in Soft Computing, which was held in Nottingham, United Kingdom on 12 and 13 December 2002 at Nottingham Trent University. This volume is organized in five parts. The first four parts address mainly the fundamental and theoretical advances in soft computing, namely Artificial Neural Networks, Evolutionary Computing, Fuzzy Systems and Hybrid Systems. The fifth part of this volume presents papers that deal with practical issues and industrial applications of soft computing techniques. We would like to express our sincere gratitude to all the authors who submitted contributions for inclusion. We are also indebted to Janusz Kacprzyk for his services related to this volume. We hope you find the volume an interesting reflection of current theoretical and application based soft computing research.

In this book about a hundred papers are presented. These were selected from over 450 papers submitted to WCCE95. The papers are of high quality and cover many aspects of computers in education. Within the overall theme of "Liberating the learner" the papers cover the following main conference themes: Accreditation, Artificial Intelligence, Costing, Developing Countries, Distance Learning, Equity Issues, Evaluation (Formative and Summative), Flexible Learning, Implications, Informatics as Study Topic, Information Technology, Infrastructure, Integration, Knowledge as a Resource, Learner Centred Learning, Methodologies, National Policies, Resources, Social Issues, Software, Teacher Education, Tutoring, Visions. Also included are papers from the chairpersons of the six IFIP Working Groups on education (elementary/primary education, secondary education, university education, vocational education and training, research on educational applications and distance learning). In these papers the work in the groups is explained and a basis is given for the work of Professional Groups during the world conference. In the Professional Groups experts share their experience and expertise with other expert practitioners and contribute to a postconference report which will determine future actions of IFIP with respect to education. J. David Tinsley J. van Weert Tom Editors Acknowledgement The editors wish to thank Deryn Watson of Kings College London for organizing the paper reviewing process. The editors also wish to thank the School of Informatics, Faculty of Mathematics and Informatics of the Catholic University of Nijmegen for its support in the production of this document.

This book helps practitioners and researchers find ways to solve difficult nonlinear system identification problems using the well-established NARMAX method. It is a description of a class of system identification algorithms that can be used to identify nonlinear dynamic models from recorded data. Written with an emphasis on making algorithms and methods accessible so that they can be applied and used in practice, this book also addresses frequency and spatio-temporal methods rarely covered elsewhere, and which can provide significant insights into complex system behaviours. The proceedings of SocProS 2015 will serve as an academic bonanza for scientists and researchers working in the field of Soft Computing. This book contains theoretical

as well as practical aspects using fuzzy logic, neural networks, evolutionary algorithms, swarm intelligence algorithms, etc., with many applications under the umbrella of 'Soft Computing'. The book will be beneficial for young as well as experienced researchers dealing across complex and intricate real world problems for which finding a solution by traditional methods is a difficult task. The different application areas covered in the proceedings are: Image Processing, Cryptanalysis, Industrial Optimization, Supply Chain Management, Newly Proposed Nature Inspired Algorithms, Signal Processing, Problems related to Medical and Health Care, Networking Optimization Problems, etc. The author presents current work in bond graph methodology by providing a compilation of contributions from experts across the world that covers theoretical topics, applications in various areas as well as software for bond graph modeling. It addresses readers in academia and in industry concerned with the analysis of multidisciplinary engineering systems or control system design who are interested to see how latest developments in bond graph methodology with regard to theory and applications can serve their needs in their engineering fields. This presentation of advanced work in bond graph modeling presents the leading edge of research in this field. It is hoped that it stimulates new ideas with regard to further progress in theory and in applications. "Vive la Revolution!" was the theme of the Twenty-Third Symposium on Naval Hydrodynamics held in Val de Reuil, France, from September 17-22, 2000 as more than 140 experts in ship design, construction, and operation came together to exchange naval research developments. The forum encouraged both formal and informal discussion of presented papers, and the occasion provides an opportunity for direct communication between international peers. This book includes sixty-three papers presented at the symposium which was organized jointly by the Office of Naval Research, the National Research Council (Naval Studies Board), and the Bassin d'Essais des Carènes. This book includes the ten topical areas discussed at the symposium: wave-induced motions and loads, hydrodynamics in ship design, propulsor hydrodynamics and hydroacoustics, CFD validation, viscous ship hydrodynamics, cavitation and bubbly flow, wave hydrodynamics, wake dynamics, shallow water hydrodynamics, and fluid dynamics in the naval context.

The two-volume set LNAI 6591 and LNCS 6592 constitutes the refereed proceedings of the Third International Conference on Intelligent Information and Database Systems, ACIIDS 2011, held in Daegu, Korea, in April 2011. The 110 revised papers presented together with 2 keynote speeches were carefully reviewed and selected from 310 submissions. The papers are thematically divided into two volumes; they cover the following topics: intelligent database systems, data warehouses and data mining, natural language processing and computational linguistics, semantic Web, social networks and recommendation systems, technologies for intelligent information systems, collaborative systems and applications, e-business and e-commerce systems, e-learning systems, information modeling and requirements engineering, information retrieval systems, intelligent agents and multi-agent systems, intelligent information systems, intelligent internet systems, intelligent optimization techniques, object-relational DBMS, ontologies and knowledge sharing, semi-structured and XML database systems, unified modeling language and unified processes, Web services and semantic Web, computer networks and communication systems.

The effectiveness of proportional-integral-derivative (PID) controllers for a large class of

process systems has ensured their continued and widespread use in industry. Similarly there has been a continued interest from academia in devising new ways of approaching the PID tuning problem. To the industrial engineer and many control academics this work has previously appeared fragmented; but a key determinant of this literature is the type of process model information used in the PID tuning methods. PID Control presents a set of coordinated contributions illustrating methods, old and new, that cover the range of process model assumptions systematically. After a review of PID technology, these contributions begin with model-free methods, progress through non-parametric model methods (relay experiment and phase-locked-loop procedures), visit fuzzy-logic- and genetic-algorithm-based methods; introduce a novel subspace identification method before closing with an interesting set of parametric model techniques including a chapter on predictive PID controllers. Highlights of PID Control include: an introduction to PID control technology features and typical industrial implementations; chapter contributions ordered by the increasing quality of the model information used; novel PID control concepts for multivariable processes. PID Control will be useful to industry-based engineers wanting a better understanding of what is involved in the steps to a new generation of PID controller techniques. Academics wishing to have a broader perspective of PID control research and development will find useful pedagogical material and research ideas in this text.

It is rare that a book draws together the knowledge and experience of scientists, each a world leader in their discipline, to create a work that presents the state of the art in a field as rich and diverse as solar energy. In *Solar Energy -- the State of the Art* this aim has been achieved. The book comprises 12 individual chapters, each dedicated to one of the major solar energy sub-disciplines and authored by an internationally recognized expert in the field. Areas covered range from solar radiation and meteorology, solar collectors and concentrators, solar energy and the built environment, to solar thermal electricity, photovoltaics, wind energy and the potential cost of ignoring solar energy resources. The papers examine the technology and field in question, discuss the rudiments and major applications, review the current science and technology and explore the remaining challenges for the future. TOPICS include: \* solar and natural resources for a better efficiency in the built environment \* glazings and coatings \* selectively solar-absorbing coatings \* solar collectors \* solar water heating \* photovoltaic physics and devices \* solar concentrators \* the cost of pollution and the benefit of solar energy \* solar process heat: distillation, drying, agricultural and industrial uses \* solar resource assessment: a review \* solar thermal electricity \* wind energy review *Solar Energy -- the State of the Art* is an essential reference work for all solar energy practitioners, students, researchers and engineers wishing to gain a broad-based understanding of the theory, technology, applications and issues surrounding the broad, interdisciplinary field of solar energy. The book will form an important component of any library's solar energy holding and will be of particular benefit as an academic reference, as well as being of practical value to professionals who wish to gain a clear understanding of the concepts required to move forward in this field. *Solar Energy -- the State of the Art* is an initiative of the International Solar Energy Society (ISES).

*Novel Algorithms and Techniques in Telecommunications, Automation and Industrial Electronics* includes a set of rigorously reviewed world-class manuscripts addressing and detailing state-of-the-art research projects in the areas of Industrial Electronics,

Technology and Automation, Telecommunications and Networking. Novel Algorithms and Techniques in Telecommunications, Automation and Industrial Electronics includes selected papers from the conference proceedings of the International Conference on Industrial Electronics, Technology and Automation (IETA 2007) and International Conference on Telecommunications and Networking (TeNe 07) which were part of the International Joint Conferences on Computer, Information and Systems Sciences and Engineering (CISSE 2007).

The Mexican International Conference on Artificial Intelligence (MICAI) is a biennial conference established to promote research in artificial intelligence (AI), and cooperation among Mexican researchers and their peers worldwide. MICAI is organized by the Mexican Society for Artificial Intelligence (SMIA), in collaboration with the American Association for Artificial Intelligence (AAAI) and the Mexican Society for Computer Science (SMCC). After two successful conferences, we are pleased to present the 3rd Mexican International Conference on Artificial Intelligence, MICAI 2004, which took place on April 26-30, 2004, in Mexico City, Mexico. This volume contains the papers included in the conference main program, which was complemented by tutorials and workshops, published in supplementary proceedings. The proceedings of past MICAI conferences, 2000 and 2002, were also published in Springer-Verlag's Lecture Notes in Artificial Intelligence (LNAI) series, volumes 1793 and 2313. The number of submissions to MICAI 2004 was significantly higher than those of previous conferences -- 254 papers from 19 different countries were submitted for consideration to MICAI 2004. The evaluation of this unexpectedly large number of papers was a challenge, both in terms of the quality of the papers and of the review workload of each PC member. After a thorough reviewing process, MICAI's Program Committee and Programs Chairs accepted 97 high-quality papers. So the acceptance rate was 38.2%. CyberChair, a free Web-based paper submission and reviewing system, was used as an electronic support for the reviewing process. This book contains revised versions of the 94 papers presented at the conference. The volume is structured into 13 thematic fields according to the topics addressed by the papers, which are representative of the main current area of interest within the AI community.

Nowadays, the liquid level control is one most important element in industrial field especially in chemical industry. The basic concept of how the coupled tanks system work in this project is by using computer as the main control where user can control the level of liquid in one tank or both tanks. The purpose of this project is to implement PID controller on coupled tank liquid level system by using visual basic software. The visual basic software are used because it easy to interface with hardware. PID controller was used due to widely acceptance applicability in process industry. The mathematical model of PID controller was used implement as such to produces suitable output so that the liquid level can be controlled at desired set point. Meanwhile, the mathematical model of coupled tank liquid level system was derived to obtain the transfer function of the plant and later be used to simulate the plant performance in MATLAB program. Industries such as petro-chemical industries, paper making industries, waste management and others are the vital industries where liquid level and flow control are essential. Liquids will be processed by chemical or mixing treatment in the tanks, but always the level fluid in the tanks must be controlled, and the flow between tanks must be regulated in the presence of nonlinearity and inexact model description of the plant.

This project investigates the usage of Proportional-Integral-Derivative (PID) controller in controlling the liquid level in the second tank of Coupled-Tank plant through variable manipulation of water pump in the first tank. This project presents the ability of controlling the liquid level of a coupled tank system that used Programmable Logic Controller (PLC) as a main controller hardware. A PID controller has been developed and designed via ladder programme of CXprogrammer. A mathematical model of the couple tank system was derived by referring to the experimental manual and verified by using MATLAB software. The controller parameters derived from the simulation and design process using MATLAB as well. The project is based on Single Input Single Output (SISO) system which mean the liquid will entering the tank 1 (pump 1) in couple tank while the level control is in tank 2 in the condition of pump 2 is set OFF. The aim of the project is to design controller that can maintain the level and minimize the error (SPCV) value at any of given set point(SP). It is to show that PID controller could produce appropriate control signal to the coupled-tank system and minimize the error value for the system. A series of tracking performance tests conducted to evaluate the controller performance in comparison to other controller such are fuzzy controller, DMRAC controller or other controller that used by other reearcher before. . The outcome of the project reveals that PID controller could carry a small error rate when the appropriate value of  $K_p$ ,  $K_i$ , and  $K_d$  are applied. The framework of this project is generic enough to have an overview of the possible outcome before implementing the PID controller in real-time system in the future.

Computer Aided Design of Multivariable Technological Systems covers the proceedings of the Second International Federation of Automatic Control (IFAC). The book reviews papers that discuss topics about the use of Computer Aided Design (CAD) in designing multivariable system, such as theoretical issues, applications, and implementations. The book tackles several topics relevant to the use of CAD in designing multivariable systems. Topics include quasi-classical approach to multivariable feedback system designs; fuzzy control for multivariable systems; root loci with multiple gain parameters; multivariable frequency domain stability criteria; and computational algorithms for pole assignment in linear multivariable systems. The text will be of great use to professionals whose work involves designing and implementing multivariable systems.

The present book is based on the research papers presented in the International Conference on Soft Computing for Problem Solving (SocProS 2012), held at JK Lakshmipat University, Jaipur, India. This book provides the latest developments in the area of soft computing and covers a variety of topics, including mathematical modeling, image processing, optimization, swarm intelligence, evolutionary algorithms, fuzzy logic, neural networks, forecasting, data mining, etc. The objective of the book is to familiarize the reader with the latest scientific developments that are taking place in various fields and the latest sophisticated problem solving tools that are being developed to deal with the complex and intricate problems that are otherwise difficult to solve by the usual and traditional methods. The book is directed to the researchers and scientists engaged in various fields of Science and Technology.

This book gathers selected papers presented at the 2020 World Conference on Information Systems and Technologies (WorldCIST'20), held in Budva, Montenegro, from April 7 to 10, 2020. WorldCIST provides a global forum for researchers and practitioners to present and discuss recent results and innovations, current trends,

professional experiences with and challenges regarding various aspects of modern information systems and technologies. The main topics covered are A) Information and Knowledge Management; B) Organizational Models and Information Systems; C) Software and Systems Modeling; D) Software Systems, Architectures, Applications and Tools; E) Multimedia Systems and Applications; F) Computer Networks, Mobility and Pervasive Systems; G) Intelligent and Decision Support Systems; H) Big Data Analytics and Applications; I) Human–Computer Interaction; J) Ethics, Computers & Security; K) Health Informatics; L) Information Technologies in Education; M) Information Technologies in Radiocommunications; and N) Technologies for Biomedical Applications.

This edited monograph includes state-of-the-art contributions on continuous time dynamical networks with delays. The book is divided into four parts. The first part presents tools and methods for the analysis of time-delay systems with a particular attention on control problems of large scale or infinite-dimensional systems with delays. The second part of the book is dedicated to the use of time-delay models for the analysis and design of Networked Control Systems. The third part of the book focuses on the analysis and design of systems with asynchronous sampling intervals which occur in Networked Control Systems. The last part of the book exposes several contributions dealing with the design of cooperative control and observation laws for networked control systems. The target audience primarily comprises researchers and experts in the field of control theory, but the book may also be beneficial for graduate students.

Fault-tolerant control aims at a gradual shutdown response in automated systems when faults occur. It satisfies the industrial demand for enhanced availability and safety, in contrast to traditional reactions to faults, which bring about sudden shutdowns and loss of availability. The book presents effective model-based analysis and design methods for fault diagnosis and fault-tolerant control. Architectural and structural models are used to analyse the propagation of the fault through the process, to test the fault detectability and to find the redundancies in the process that can be used to ensure fault tolerance. It also introduces design methods suitable for diagnostic systems and fault-tolerant controllers for continuous processes that are described by analytical models of discrete-event systems represented by automata. The book is suitable for engineering students, engineers in industry and researchers who wish to get an overview of the variety of approaches to process diagnosis and fault-tolerant control. The authors have extensive teaching experience with graduate and PhD students, as well as with industrial experts. Parts of this book have been used in courses for this audience. The authors give a comprehensive introduction to the main ideas of diagnosis and fault-tolerant control and present some of their most recent research achievements obtained together with their research groups in a close cooperation with European research projects. The third edition resulted from a major re-structuring and re-writing of the former edition, which has been used for a decade by numerous research groups. New material includes distributed diagnosis of continuous and discrete-event systems, methods for reconfigurability analysis, and extensions of the structural methods towards fault-tolerant control. The bibliographical notes at the end of all chapters have been up-dated. The chapters end with exercises to be used in lectures.

This Proceedings contains the papers presented at the 14th International Conference on Condition Monitoring and Diagnostic Engineering Management (COMADEM 2001), held in Manchester, UK, on 4-6 September 2001. COMADEM 2001 builds on the excellent reputation of previous conferences in this series, and is essential for anyone working in the field of condition monitoring and maintenance management. The scope of the conference is truly interdisciplinary. The Proceedings contains papers from six continents, written by experts in industry and academia the world over, bringing together the latest thoughts on topics including: Condition-based maintenance Reliability centred maintenance Asset management Industrial case studies Fault detection and diagnosis Prognostics Non-destructive evaluation Integrated diagnostics Vibration Oil and debris analysis Tribology Thermal techniques Risk assessment Structural health monitoring Sensor technology Advanced signal processing Neural networks Multivariate statistics Data compression and fusion This Proceedings also contains a wealth of industrial case studies, and the latest developments in education, training and certification. For more information on COMADEM's aims and scope, please visit <http://www.comadem.com>

This book includes a selection of papers from the 2018 World Conference on Information Systems and Technologies (WorldCIST'18), held in Naples, Italy on March 27-29, 2018. WorldCIST is a global forum for researchers and practitioners to present and discuss recent results and innovations, current trends, professional experiences and the challenges of modern information systems and technologies research together with their technological development and applications. The main topics covered are: A) Information and Knowledge Management; B) Organizational Models and Information Systems; C) Software and Systems Modeling; D) Software Systems, Architectures, Applications and Tools; E) Multimedia Systems and Applications; F) Computer Networks, Mobility and Pervasive Systems; G) Intelligent and Decision Support Systems; H) Big Data Analytics and Applications; I) Human-Computer Interaction; J) Ethics, Computers & Security; K) Health Informatics; L) Information Technologies in Education; M) Information Technologies in Radiocommunications; N) Technologies for Biomedical Applications.

In this book, a methodology integrating qualitative reasoning and bond graphs is developed to construct intelligent supervisory control systems. Qualitative reasoning is a powerful model-based reasoning method while bond graphs are a formal modelling language for dynamic systems. Their integration and qualitative reasoning on bond graphs results in a problem-solving approach to artificial intelligence, in which qualitative reasoning is used as the general reasoning strategy and bond graphs are employed as the knowledge representation. A systematic modelling procedure based on qualitative bond graphs is presented. A controller design method is developed to derive control algorithms from qualitative bond graph models. An auto-tuning scheme is proposed to adjust the controllers in order to meet performance criteria and adapt to system changes. A fault diagnosis mechanism is built to localise system faults, and an additional measurement suggestion method is developed for the diagnosis result refinement. An automatic planner is proposed to generate the operation sequences for system start-up, shut-down, and emergency measures to help human operators operate systems safely. All of these applications are combined together via a management mechanism to construct a supervisory control system.



This book constitutes the refereed proceedings of the First International Conference on Smart Trends in Information Technology and Computer Communications, SmartCom 2016, held in Jaipur, India, in August 2016. The 106 revised papers presented were carefully reviewed and selected from 469 submissions. The papers address issues on smart and secure systems; technologies for digital world; data centric approaches; applications for e-agriculture and e-health; products and IT innovations; research for knowledge computing.

Coupled Tank system used for liquid level control is a model of plant that has usually been used in industries especially chemical process industries. Level control is also very important for mixing reactant process. The basic concept of how the coupled tanks system work in this project is by using computer as the main control where user can control the level of liquid in one tank or both tanks. To control the liquid level automatically, a controller is needed to be implemented. For this project, LQR controller is used. Advantech USB 4716 DAQ is a device use to communicate between computer and the computer. Basically, this project focuses on the design and modeling for coupled tanks system with the implementation of LQR controller. Mathematical model of the system is first taken from manual book provided by AISB Sdn. Bhd. and verified by MATLAB. Based on the simulation result, the value of state feedback produce by LQR is used in Visual Basic to see the response in real time process.

This book provides an overview of state-of-the-art methods in computational engineering for modeling and simulation. This proceedings volume includes a selection of refereed papers presented at the International Conference on Advances in Computational Mechanics (ACOME) 2017, which took place on Phu Quoc Island, Vietnam on August 2-4, 2017. The contributions highlight recent advances in and innovative applications of computational mechanics. Subjects covered include: biological systems; damage, fracture and failure; flow problems; multiscale multiphysics problems; composites and hybrid structures; optimization and inverse problems; lightweight structures; computational mechatronics; computational dynamics; numerical methods; and high-performance computing. The book is intended for academics, including graduate students and experienced researchers interested in state-of-the-art computational methods for solving challenging problems in engineering.

The presence of considerable time delays in many industrial processes is well recognized and achievable performances of conventional unity feedback control systems are degraded if a process has a relatively large time delay compared to its time constants. In this case, dead time compensation is necessary in order to enhance the performances. The most popular scheme for such compensation is the Smith Predictor, but it is unsuitable for unstable or lightly damped processes because the compensated closed-loop system always contains the process poles themselves. An alternative scheme for delay elimination from the closed-loop is the finite spectrum assignment (FSA) strategy and it can arbitrarily assign the closed-loop spectrum. One may note that the Smith Predictor Control can be

found in delay systems control books and many process control books, but the FSA control is rarely included in these books. It is therefore timely and desirable to fill this gap by writing a book which gives a comprehensive treatment of the FSA approach. This is useful and worthwhile since the FSA provides not only an alternative way but also certain advantages over the Smith-Predictor. The book presents the state-of-the-art of the finite spectrum assignment for time-delay systems in frequency domain. It mainly contains those works carried out recently by the authors in this field. Most of them have been published and others are awaiting publication. They are assembled together and reorganized in such a way that the presentation is logical, smooth and systematic.

Today, online technologies are at the core of most fields of engineering and society as a whole. This book discusses the fundamentals, applications and lessons learned in the field of online and remote engineering, virtual instrumentation, and other related technologies like Cross Reality, Data Science & Big Data, Internet of Things & Industrial Internet of Things, Industry 4.0, Cyber Security, and M2M & Smart Objects. Since the first Remote Engineering and Virtual Instrumentation (REV) conference in 2004, the event has focused on the use of the Internet for engineering tasks, as well as the related opportunities and challenges. In a globally connected world, interest in online collaboration, teleworking, remote services, and other digital working environments is rapidly increasing. In this context, the REV conferences discuss fundamentals, applications and experiences in the field of Online and Remote Engineering as well as Virtual Instrumentation. Furthermore, the conferences focus on guidelines and new concepts for engineering education in higher and vocational education institutions, including emerging technologies in learning, MOOCs & MOOLs, and open resources. This book presents the proceedings of REV2020 on “Cross Reality and Data Science in Engineering” which was held as the 17th in series of annual events. It was organized in cooperation with the Engineering Education Transformations Institute and the Georgia Informatics Institutes for Research and Education and was held at the College of Engineering at the University of Georgia in Athens (GA), USA, from February 26 to 28, 2020.

This book is a collection of selected peer-reviewed papers presented at the International Conference on Signal Processing and Communication (ICSC 2018). It covers current research and developments in the fields of communications, signal processing, VLSI circuits and systems, and embedded systems. The book offers in-depth discussions and analyses of latest problems across different sub-fields of signal processing and communications. The contents of this book will prove to be useful for students, researchers, and professionals working in electronics and electrical engineering, as well as other allied fields.

This is the third in a series of conferences devoted primarily to the theory and applications of artificial neural networks and genetic algorithms. The first such event was held in Innsbruck, Austria, in April 1993, the second in Ales, France, in April 1995. We are pleased to host the 1997 event in the mediaeval city of

Norwich, England, and to carry on the fine tradition set by its predecessors of providing a relaxed and stimulating environment for both established and emerging researchers working in these and other, related fields. This series of conferences is unique in recognising the relation between the two main themes of artificial neural networks and genetic algorithms, each having its origin in a natural process fundamental to life on earth, and each now well established as a paradigm fundamental to continuing technological development through the solution of complex, industrial, commercial and financial problems. This is well illustrated in this volume by the numerous applications of both paradigms to new and challenging problems. The third key theme of the series, therefore, is the integration of both technologies, either through the use of the genetic algorithm to construct the most effective network architecture for the problem in hand, or, more recently, the use of neural networks as approximate fitness functions for a genetic algorithm searching for good solutions in an 'incomplete' solution space, i.e. one for which the fitness is not easily established for every possible solution instance.

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